

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

SYNOPSYS, INC.,  
a Delaware Corporation,

Plaintiff and  
Counter-Defendant,

v.

MAGMA DESIGN AUTOMATION, INC., a  
Delaware Corporation

Defendant and  
Counterclaimant.

C.A. No. 05-701-GMS

**DEFENDANT MAGMA  
DESIGN AUTOMATION, INC.'S  
AMENDED ANSWER TO  
COMPLAINT AND  
COUNTERCLAIMS**

**DEMAND FOR JURY TRIAL**

AND RELATED COUNTERCLAIMS.

Defendant Magma Design Automation, Inc. (“Magma”), by and through its attorneys, states as follows:

**PRELIMINARY STATEMENT**

1. This lawsuit is just the latest in a series of anticompetitive, exclusionary, and fraudulent acts committed by Synopsys, Inc. (“Synopsys”), all intended to monopolize and unfairly restrain trade in certain important electronic design automation (“EDA”) markets.

2. On September 17, 2004, Synopsys sued Magma in United States District Court for the Northern District of California for alleged infringement of three patents related to methods for designing integrated circuits, U.S. Patent Nos. 6,378,114 (“the ‘114 Patent”), 6,453,446 (“the ‘446 Patent”), and 6,725,438 (“the ‘438 Patent”). The complaint, styled *Synopsys, Inc. v. Magma Design Automation, Inc.*, Civil Action No. C04-03923(MMC) (“the Northern District Action”), seeks unspecified monetary damages, injunctive relief, trebling of damages, fees and costs, and the imposition of a constructive trust for the benefit of Synopsys

over any profits, revenues or other benefits allegedly obtained by Magma as a result of its alleged infringement of the patents-in-suit. The companies vigorously dispute ownership over two of the patents-in-suit, the '446 and '438 Patents, although Magma is the record owner of both.

3. On January 28, 2005, Synopsys filed documents with the U.S. Patent and Trademark Office ("PTO") in an attempt to assign the '446 Patent, the '438 Patent and a pending continuation of the '438 Patent to Synopsys and transfer power of attorney over the patents and application to Synopsys. The PTO dismissed Synopsys's attempt and indicated that Synopsys's purported "assignment" recorded against the patents and application "fail[ed] to establish that Synopsys is the assignee" of the patents and application. The PTO also indicated that further attempts by Synopsys to control the prosecution of the pending application would be regarded as "correspondence filed for an improper purpose."

4. On April 18, 2005, Synopsys filed an action against Magma in Germany seeking to obtain ownership of the European patent application corresponding to the '446 Patent. Magma was forced to obtain German counsel in order to seek a stay of the foreign action during the pendency of the Northern District Action.

5. Similarly, on July 29, 2005, Synopsys filed an action in Japan attempting to acquire ownership of the Japanese patent application corresponding to the '446 Patent. Again, Magma was forced to obtain local counsel and will seek a stay pending the outcome of the Northern District Action.

6. Then, on September 26, 2005, the same day that this action was commenced, Synopsys filed yet another lawsuit, this time in California state court. In the complaint, Synopsys alleges that Magma has engaged in unfair competition by denying that Magma infringes the '446 and '438 Patents and by asserting that those patents are invalid. Relying on a distorted and baseless interpretation of California's unfair competition laws, Synopsys seeks through this state court litigation to enjoin Magma from asserting valid defenses in the Northern District Action.

7. Like the actions described above, the instant action by Synopsys is similarly unfounded and simply part of an overall scheme to use litigation to drive Magma out of business and monopolize certain EDA software markets. Rather than amend its complaint in the Northern District Action to add the patents-in-suit—something it did three times for other reasons—Synopsys instead chose to file this suit in a different court on the other side of the country, and just one day after filing a related suit in California state court.

8. But more than that, two of the three patents asserted by Synopsys against Magma in this action—U.S. Patent No. 6,434,733 (“the ‘733 Patent”) and U.S. Patent No. 6,766,501 (“the ‘501 Patent”)—were fraudulently obtained from the Patent and Trademark Office. As detailed below, Synopsys knew that the claims of these patents were not novel when it filed the applications with the PTO. Synopsys obtained the patents only by deliberately concealing material prior art references of which both Synopsys and its patent counsel were aware. Synopsys is attempting to enforce these invalid patents in violation of United States antitrust law. Accordingly, Magma seeks redress through the counterclaims pleaded below.

#### **MAGMA’S ANSWER TO SYNOPSYS’S COMPLAINT**

Magma, by and through its attorneys, answers Synopsys’s complaint for patent infringement as follows:

9. Magma admits the allegations in paragraph 1 of the complaint.
10. Magma is without information or knowledge sufficient to form a belief as to the truth of the allegations in paragraph 2 of the complaint and on that basis denies them.
11. Magma admits the allegations in paragraph 3 of the complaint.
12. Magma admits the allegations in paragraph 4 of the complaint.
13. Magma admits that Monterey Design Systems is listed as the assignee on the face of U.S. Patent No. 6,192,508 (“the ‘508 Patent”). Magma is without information or knowledge sufficient to form a belief as to the truth of the remaining allegations in paragraph 5 of the complaint and on that basis denies them.

14. Magma admits that Synopsys is listed as the assignee on the face of U.S. Patent No. 6,434,733 ("the '733 Patent"). Magma is without information or knowledge sufficient to form a belief as to the truth of the remaining allegations contained in paragraph 6 of the complaint and on that basis denies them.

15. Magma admits that Synopsys is listed as the assignee on the face of U.S. Patent No. 6,766,501 ("the '501 Patent"). Magma is without information or knowledge sufficient to form a belief as to the truth of the remaining allegations contained in paragraph 7 of the complaint and on that basis denies them.

16. Magma denies the allegations in paragraph 8 of the complaint.
17. Magma denies the allegations in paragraph 9 of the complaint.
18. Magma denies the allegations in paragraph 10 of the complaint.
19. Magma denies the allegations in paragraph 11 of the complaint.
20. Magma denies the allegations in paragraph 12 of the complaint.
21. Magma denies the allegations in paragraph 13 of the complaint.
22. Magma denies the allegations in paragraph 14 of the complaint.
23. Magma denies the allegations in paragraph 15 of the complaint.
24. Magma denies the allegations in paragraph 16 of the complaint.
25. Magma denies the allegations in paragraph 17 of the complaint.
26. Magma denies the allegations in paragraph 18 of the complaint.
27. Magma denies the allegations in paragraph 19 of the complaint.
28. Magma denies the allegations in paragraph 20 of the complaint.
29. In response to the prayer for relief, Magma denies each and every allegation in the prayer and, further, Magma specifically denies that Synopsys is entitled to any of the relief requested in the complaint or any relief whatsoever, specifically denies that Synopsys is entitled to preliminary or permanent injunctive relief, specifically denies that Synopsys has been damaged by the acts of Magma in any amount whatsoever, specifically denies that Synopsys is entitled to any award of treble damages, specifically denies that Synopsys is entitled to its costs,

expenses or reasonable attorneys' fees, specifically denies that Synopsys is entitled to any award of interest, and specifically denies that the Court should impose a constructive trust for Synopsys's benefit.

### **AFFIRMATIVE DEFENSES**

#### **AFFIRMATIVE DEFENSES APPLICABLE TO THE '733 PATENT**

##### **FIRST AFFIRMATIVE DEFENSE**

30. Magma does not directly infringe, contributorily infringe, or induce infringement of the '733 Patent.

##### **SECOND AFFIRMATIVE DEFENSE**

31. The '733 Patent is invalid because it fails to satisfy the conditions for patentability specified in Title 35 of the United States Code, 35 U.S.C. § 101 *et seq.*

##### **THIRD AFFIRMATIVE DEFENSE**

32. The '733 Patent is unenforceable because the applicants of the '733 Patent and/or their representatives involved in the prosecution of the application leading to the issuance of the '733 Patent engaged in gross inequitable conduct by intentionally concealing material information from, and/or submitting false and misleading material information to, the PTO in the course of prosecuting and ultimately obtaining the patent.

33. At least one ostensible inventor of the '733 Patent, Thomas W. Williams, was aware of two prior art references that disclosed the inventions of the '733 Patent. Those references, papers by Barbagallo *et al.*, were published in 1996, nearly three years before Synopsys applied for '733 Patent.

34. Magma is informed and believes, and based thereon alleges, that Williams became aware of the Barbagallo references no later than June 14, 1996, when he personally presided over a conference session of the IEEE European Test Workshop at which the second Barbagallo paper was presented. Moreover, approximately six weeks earlier, Williams was a

member of the program committee at a symposium in which the first Barbagallo paper was presented.

35. Despite Williams' knowledge of the Barbagallo references, Synopsys did not disclose either reference to the PTO during the prosecution of the '733 patent. Indeed, Synopsys failed to cite any prior art whatsoever during the entire pendency of the application. Instead, Williams falsely declared that he was an original and first inventor of the subject matter claimed. Synopsys and Williams therefore violated their duties of good faith and candor to the PTO, with an intention to deceive the PTO. All claims of the '733 Patent are unenforceable as a result of this inequitable conduct.

36. The '733 Patent is also made unenforceable by the conduct of Mr. Matthews, the patent attorney who prosecuted the patent. As detailed more fully below, one of the Barbagallo papers was cited to Matthews in a related patent application he was prosecuting on behalf of Synopsys. Despite the clear materiality of the paper to the prosecution of the application for the '733 Patent, Matthews failed to alert the PTO to its existence. This was a clear violation of his duty of good faith and candor, and all claims '733 Patent are therefore unenforceable because of this additional inequitable conduct.

#### **AFFIRMATIVE DEFENSES APPLICABLE TO THE '501 PATENT**

##### **FOURTH AFFIRMATIVE DEFENSE**

37. Magma does not directly infringe, contributorily infringe, or induce infringement of the '501 Patent.

##### **FIFTH AFFIRMATIVE DEFENSE**

38. The '501 Patent is invalid because it fails to satisfy the conditions for patentability specified in Title 35 of the United States Code, 35 U.S.C. § 101 *et seq.*

##### **SIXTH AFFIRMATIVE DEFENSE**

39. The '501 Patent is unenforceable because the applicants of the '501 Patent and/or their representatives involved in the prosecution of the application leading to the issuance of the

‘501 Patent engaged in inequitable conduct by intentionally concealing material information from, and/or submitting false and misleading material information to, the PTO in the course of prosecuting and ultimately obtaining the patent.

40. The ‘501 Patent was filed as a continuation of the ‘733 Patent. Yet despite the existence of the Barbagallo references, and Williams’ participation in two conferences in which these papers were presented, Williams once again falsely declared that he was an original and first inventor of the claimed subject matter. And again, not only did Synopsys fail to cite the Barbagallo references to the PTO, Synopsys cited absolutely no prior art during the prosecution of the ‘501 Patent.

41. Synopsys’s failure to cite any prior art during the prosecution of the ‘501 Patent is extraordinary in light of the fact that the prosecution was conducted by Mr. Matthews. Although one of the Barbagallo references had been cited to him during the earlier prosecution of a related patent, Matthews again failed to bring that reference to the attention of the PTO when he filed the later application.

42. Synopsys, Williams and Matthews again violated their duties of good faith and candor to the PTO, with an intention of deceiving the PTO into issuing the ‘501 Patent. All claims of the ‘501 Patent are therefore unenforceable due to their inequitable conduct.

#### **AFFIRMATIVE DEFENSES APPLICABLE TO THE ‘508 PATENT**

##### **SEVENTH AFFIRMATIVE DEFENSE**

43. Magma does not directly infringe, contributorily infringe, or induce infringement of the ‘508 Patent.

##### **EIGHTH AFFIRMATIVE DEFENSE**

44. The ‘508 Patent is invalid because it fails to satisfy the conditions for patentability specified in Title 35 of the United States Code, 35 U.S.C. § 101 *et seq.*

**AFFIRMATIVE DEFENSES APPLICABLE TO ALL PATENTS-IN-SUIT**

**NINTH AFFIRMATIVE DEFENSE**

45. Magma is informed and believes that Synopsys has been aware of the manner of operation of Magma's EDA software products since at least 1999. Because Synopsys has unreasonably delayed in bringing this action, Synopsys's claims are barred by the doctrine of laches.

**TENTH AFFIRMATIVE DEFENSE**

46. Synopsys's claims are barred by the doctrine of waiver.

**ELEVENTH AFFIRMATIVE DEFENSE**

47. Synopsys's claims are barred by the doctrine of prosecution history estoppel.

**TWELFTH AFFIRMATIVE DEFENSE**

48. Synopsys's claims are barred by the doctrine of equitable estoppel.

**MAGMA'S COUNTERCLAIMS AGAINST SYNOPSYS**

For its counterclaims against Synopsys, defendant and counterclaimant Magma alleges on knowledge as to its own conduct and on information and belief as to all other matters, as follows:

**JURISDICTION**

49. This action arises under the patent and antitrust laws of the United States. Subject matter jurisdiction is therefore proper in this Court pursuant to 15 U.S.C. §§ 15, 26 and 28 U.S.C. §§ 1331, 1337, and 1338.

50. This Court also has jurisdiction over Magma's Lanham Act counterclaim pursuant to 15 U.S.C. §§ 1116, 1117 and 28 U.S.C. § 1338.

51. In addition, this Court has supplemental jurisdiction over Magma's counterclaims arising under Delaware state law pursuant to 28 U.S.C. § 1337(a) because these claims are so

related to the parties' claims and counterclaims under federal law that they form part of the same case and/or controversy and derive from a common nucleus of operative fact.

## PARTIES

52. Magma is a corporation organized and existing under the laws of the State of Delaware and has its principal place of business in Santa Clara, California. Magma provides electronic design automation (EDA) software and related services.

53. Synopsys is a corporation organized and existing under the laws of the State of Delaware and has its principal place of business in Mountain View, California. Synopsys also provides EDA software and related services. Synopsys sells and licenses EDA software throughout the United States and the world, and delivers copies of its software to customers across state lines and international borders. Synopsys's sales and licenses in the United States represent a regular, continuous and substantial flow of interstate commerce.

## VENUE

54. Synopsys is incorporated in this judicial district and has sufficient contacts with this district to subject itself to the jurisdiction of this Court. Moreover, by bringing its complaint against Magma in this Court, Synopsys consented to the Court's jurisdiction. Personal jurisdiction and venue are therefore proper in this district pursuant to 28 U.S.C. §§ 1391, 1400(b).

### **FACTS RELEVANT TO MAGMA'S COUNTERCLAIMS**

#### **ELECTRONIC DESIGN AUTOMATION**

55. Broadly speaking, electronic design automation, or EDA, can be defined as the use of computers to design, lay out, verify and simulate the performance of electronic circuits on a chip or printed circuit board. EDA companies develop and sell software programs and related services that are used to design and test these integrated circuits, or ICs. EDA programs are crucial to the development and growth of the semiconductor industry.

56. Indeed, it would be impossible to design modern ICs without advanced EDA software. Feature density, speed, efficiency, and functional capacity of ICs continue to increase at a dramatic rate. Current generation ICs hold tens of millions of transistors and have feature widths of 130 nanometers (billions of a meter) and below. ICs such as microprocessors can execute hundreds of millions of instructions every second.

57. A primary function of EDA software is to translate high-level descriptions of an integrated circuit into the basic components that will be fabricated on the chip. This process is called logic synthesis. High-level descriptions, referred to as register transfer level ("RTL") specifications, can be written directly by a design engineer or can be generated by a software program. In logic synthesis, EDA software tools convert the RTL specifications into an interconnected set of logic gates. (A logic gate performs a basic logical function, such as comparing two signals and producing a result.) The tools produce a data file known as a "netlist" that describes the logic gates and their interconnections. The design must be "mapped" to an IC manufacturer's "cell library," which is made up pre-designed groups of transistors that perform the functions of the gates. The logic synthesis phase is also referred to as the "front-end" phase.

58. Another primary function of EDA software is to create a detailed physical layout of the chip, precisely locating within the chip's boundary each of the components and the wires that interconnect them. This process is called physical design. Physical design uses the netlist produced by logic synthesis to determine the actual physical location within the chip's area of all of the transistors that comprise the cells. The physical design process also will designate the actual routes of the wires that will connect the cells on the IC. The result of physical design is a detailed layout that is used to fabricate the IC. The physical design or the physical synthesis phase is also referred to as the "back-end" phase.

59. Several intermediate design steps are required to implement both the logic and the physical design phase. The keys steps in a combined design flow include behavioral synthesis, logic optimization, placement, and routing. Interlaced between these steps are numerous

analysis steps, such as timing, power analysis, clock tree synthesis, parasitic extraction, and signal integrity analysis, that optimize a particular set of design criteria. A designer will often perform several iterations among these steps to ensure that the IC design satisfies all the constraints.

60. Each step in the IC design flow is accomplished by a specific software tool that leverages unique algorithms or heuristic techniques that are best suited to accomplish the specific purpose intended for that tool. Therefore, the software tools need a mechanism to share the design data.

61. The conventional approach has been to store the design data for an IC in a common database that is saved on a computer disk. Each software tool reads the design from the database into the main (or active) memory of the computer, makes changes to the design, and then writes the updated design back into the database. When reading the design data from the database, each tool builds in the main memory its own internal run-time data model, which is designed to best support the algorithms of that particular tool. After the tool exits, that data model is discarded.

62. This approach slows down the design process considerably because each time a software tool is invoked, it incurs the overhead of transferring hundreds of megabytes of data between the disk and the active memory. This can be very time consuming for large IC designs. Additionally, lack of a single data model drastically reduces the effectiveness of the design process, because the database read/write steps make both communication and iteration between the tools extremely cumbersome.

#### **THE TECHNOLOGY OF THE '733 AND '501 PATENTS**

63. A fundamental aspect of integrated circuit design is the incorporation of testing circuitry so that the devices can be tested after manufacturing. Practically all IC testing circuitry employs what are known as "scan chains." A scan chain is a collection of storage elements that

are linked together in a chain and can be sequentially read from and written to during a debugging mode in the testing process.

64. The use of scan chains and the debugging equipment that can read and write storage elements that are connected in a scan chain is well established. One issue that arises in the design of scan chains is the specification of the exact order of the storage elements in the chain. Typically the order of the storage elements is irrelevant because the debugging equipment can accommodate any order. This means that the scan chains can be re-ordered during the physical design process to optimize the layout of the wires that connect a scan chain together. The exact sequence of storage elements in a scan chain chosen by the physical design tool is then used by the debugging equipment in order to test the chip.

65. When physical design tools re-order a scan chain, problems may arise if certain portions of a scan chain need to be kept together. One scenario in which this occurs is when the storage elements that are in a scan chain are clocked by two different clock signals. In this situation, it is usually necessary to keep the groups clocked by each clock together in segregated portions of the scan chain.

66. To address the problems that arise with unrestricted scan-chain reordering, the concept of scan-chain partitioning has been utilized. Scan-chain partitioning involves the analysis of a scan chain to determine which storage elements must be kept together in one group. This information is then communicated to the physical design tools so that the scan chains within each group can be re-ordered to optimize the layout, while preserving the requirement that each group of elements stay together. The '733 and '501 Patents both relate to the concept of scan-chain partitioning.

#### **SYNOPSYS'S FRAUDULENT PROCUREMENT OF THE '733 AND '501 PATENTS**

67. Both the '733 Patent and its continuation, the '501 Patent, were fraudulently obtained by Synopsys. As described in detail below, one of the ostensible inventors of both patents, T.W. Williams, participated in two 1996 conferences at which two invalidating prior art

references were disclosed by a group of Italian researchers. Williams nevertheless declared to the PTO, in the applications for both the '733 Patent and the '501 Patent, that he was an original and first inventor of the subject matter claimed. In addition, the attorney prosecuting the '733 Patent, M.D. Matthews, failed to cite either invalidating reference to the PTO, even though the PTO had cited one reference to Matthews during the prosecution of a related patent. Later, when Matthews filed the '501 Patent application, he again failed to cite either reference.

### **THE FILING OF THE '733 AND '355 PATENTS**

68. On March 24, 1999, Synopsys, through its patent prosecution counsel, Wagner Murabito & Hao LLP, filed with the PTO the patent application that would later issue as the '733 Patent. The application ("the '733 Application") listed three inventors: Suryanarayana Duggirala, Rohit Kapur, and Thomas W. Williams. The '733 Application was assigned to patent examiner Vuthe Siek. The application cited *no* prior art.

69. One week later, on March 31, 1999, Synopsys filed a continuation-in-part of the '733 Application that would eventually issue as U.S. Patent No. 6,405,355 ("the '355 Patent"). Like the '733 Application, this application ("the '355 Application") listed Duggirala, Kapur, and Williams as its inventors and was prosecuted by the firm Wagner Murabito & Hao LLP. It too cited absolutely *no* prior art. The '355 Application was, however, assigned to a different patent examiner, N. Le.

### **THE BARBAGALLO PAPERS**

70. Nearly three years earlier, on or about April 28, 1996, six Italian researchers—S. Barbagallo, M. Lobetti Bodoni, D. Medina, F. Corno, P. Prinetto, and M. Sonza Reorda—had presented a paper to the Institute of Electrical and Electronics Engineers (IEEE) 14th Annual VLSI Test Symposium in Princeton, New Jersey (VTS '96). The paper ("the VTS Paper") was entitled "Scan Insertion Criteria for Low Design Impact," and discussed the partitioning and re-ordering of scan chains.

71. In particular, the VTS Paper described the creation of scan-chain partitions based on clock domains and other factors, and disclosed an algorithm that implements that scan-chain partitioning. The '733 Patent discusses "scan chain portioning ... based on clock domains" and other factors (col. 6, lns. 64-68). Similarly, the '501 Patent discusses scan-chain partitioning "based on clock domain information" as well as other factors (col. 9, lns. 19-21). The VTS paper therefore anticipates or renders obvious all of the claims of both the '733 Patent and the '501 Patent.

72. One of the members of the Program Committee for VTS '96, and a listed Reviewer, was **Thomas W. Williams**, one of the inventors listed on the '733, '355 and '501 Patents later filed by Synopsys. (At the time, Williams was working at IBM.)

73. A few weeks later, on or about June 12, 1996, Barabagallo *et al.* presented a second paper at the IEEE European Test Workshop in Montpellier, France (ETW '96). The paper ("the ETW Paper") was entitled "Layout-Driven Scan Chain Partitioning and Reordering" and built on the ideas presented at VTS '96. The ETW Paper cited the VTS Paper and, like the first paper, anticipates or renders obvious all of the claims of both the '733 Patent and the '501 Patent.

74. In particular, the ETW Paper discloses "an approach [that] takes into account the constraints coming from clock domains, i.e., FFs [fed] by the same clock tree are assigned to the same set" and that re-ordering occurs only within same sets. (ETW Paper at p. 2.) The '733 and '501 Patent also teach the creation of sets based on clock domain restrictions and the re-ordering of scan cells only within those sets. ('733 Patent, col. 7, lns. 19-22; '501 Patent, col. 3, lns. 47-55.)

75. The **chairperson** for the session at which the invalidating ETW Paper was presented was none other than **Thomas W. Williams**.

## THE PROSECUTION OF THE '733 AND '355 PATENTS

76. As described more specifically below, the '733 and '355 Applications were prosecuted in parallel throughout 2001 and 2002 by the same patent attorney at Wagner Murabito & Hao LLP, one M.D. Matthews.

77. On March 26, 2001, the PTO issued a First Office Action in which it rejected all claims of the '733 Application as unpatentable in light of two other U.S. patents by Crouch *et al.* and Beausang *et al.* The examiner, V. Siek, also cited a number of other U.S. patents and technical articles as relevant prior art.

78. On April 19, 2001, the PTO issued a First Office Action with respect to the '355 Application, also rejecting all claims as unpatentable in light of two U.S. patents granted to Narayanan *et al.* and Giles *et al.* Examiner Le cited a number of other patents and articles, one of which was the paper presented by Barbagallo *et al.* at the VLSI Test Symposium in April 1996 (the VTS Paper).

79. On June 29, 2001, M.D. Matthews of Wagner Murabito & Hao LLP responded to the Office Action on the '733 Application, arguing that its claims were not anticipated by Crouch and Beausang. Despite the fact that the VTS Paper had been cited by Examiner Le in the Office Action on the '355 Application—and was more material than the Crouch and Beausang patents, either separately or in combination—Matthews neglected to bring the paper to the attention of Examiner Siek by, for example, filing an Information Disclosure Statement (IDS).

80. On July 25, 2001, Matthews responded to the '355 Office Action, arguing to Examiner Le that the claims of the '355 Application are patentable over Narayanan and Giles.

81. On September 25, 2001, Examiner Siek issued a Final Office Action on the '733 Application, again rejecting all claims of the application in light of Crouch and Beausang.

82. On October 5, 2001, Examiner Le issued a Final Office Action on the '355 Application, rejecting all claims in light of Narayanan and Giles. On December 5, Matthews responded, again arguing that the references do not render the claims of the '355 Application unpatentable.

83. On December 26, 2001, Mr. Mathews responded to the Final Office Action on the '733 Application, once again arguing that the claims of the '733 Application were patentable over Crouch and Beausang. Mathews again failed to alert Examiner Siek to the existence of the Barbagallo paper cited by Examiner Le in the '355 Application, despite the fact that the paper was a much more material prior art reference than either the Crouch patent or the Beausang patent.

84. On January 17, 2002, Examiner Le issued a Notice of Allowance for the '355 Application.

85. On March 2, 2002, Examiner Siek, still unaware of the Barbagallo reference, issued a Notice of Allowance for the '733 Application.

86. On June 11, 2002, the '355 Patent issued to Synopsys.

87. On August 13, 2002, the '733 Patent issued to Synopsys.

### THE PROSECUTION OF THE '501 PATENT

88. On August 12, 2002, one day before the '733 Patent was issued, Synopsys filed the application that would issue as the '501 Patent ("the '501 Application"). It listed the same three inventors as the '733 and '355 Applications, S. Duggirala, R. Kapur, and T.W. Williams. It was filed by the same patent attorney who had prosecuted the '733 and '355 Applications, *M.D. Mathews*. Yet incredibly, in spite of this fact, and the fact that the '501 Application was filed as a continuation of the '733 Application and would likely be assigned to the same examiner, Mathews and Synopsys again cited *no* prior art to the PTO.

89. The '501 Application was assigned to same patent examiner as the '733 Application, Vuthe Siek. On November 24, 2003, Examiner Siek issued a First Office Action, in which he rejected all claims of the '501 Application on the basis of double patenting. Undoubtedly feeling a strong sense of *déjà vu*, Examiner Siek cited the same prior art as he had for the '733 Application, plus one additional U.S. Patent.

90. On January 20, 2004, Ms. Jeannette S. Harms of the firm Bever, Hoffman & Harms LLP amended the claims, and on March 11, 2004, submitted a terminal disclaimer to

overcome the double patenting rejection. At no time during the prosecution of the '501 Application did Harms cite the Barbagallo papers to the examiner—or, indeed, any prior art whatsoever.

91. On March 22, 2004, Examiner Siek issued a Notice of Allowance, and on June 20, 2004, the '501 Patent issued to Synopsys.

#### **SYNOPSYS'S ACTS CONSTITUTE FRAUDULENT PROCUREMENT**

92. As the above facts demonstrate, Synopsys committed fraud on the PTO during the prosecution of the '733 and '501 Patents.

93. Nearly three years before filing the '733 Application, one of its ostensible inventors, Thomas W. Williams, chaired a session in which the alleged invention was presented by six other researchers. Six weeks before that, Williams had been on the Program Committee for another symposium in which the alleged invention had been disclosed. Nevertheless, on March 24, 1999, he declared in the '733 Application that he was "an original, first and joint inventor .. of the subject matter which is claimed and for which a patent is sought."

94. This was a deliberately false representation of a fact material to patentability, and made with the intent to deceive the PTO. Williams did not conceive of the alleged invention, Barbagallo and the other Italian researchers had conceived and presented it almost three years before, a fact that, upon information and belief, Williams knew by June 1996. Furthermore, because the patent was assigned to Williams' employer, his intent to deceive the PTO may be imputed to Synopsys.

95. Yet the fraud doesn't end there. Despite having one of the Barbagallo papers cited to him the PTO during the prosecution of the '355 Application, Matthews, the prosecuting patent attorney, violated his duty of candor to the PTO by neglecting to bring it to the attention of Examiner Siek during the pendency of the '733 Application.

96. This constituted a deliberate omission of a fact material to patentability, one surely made with the intent to deceive the PTO. As an agent of Synopsys acting on its behalf, Matthews' intent to deceive the PTO may also be imputed to Synopsys.

97. Because the '733 Application issued as a patent, it may be inferred that the PTO relied on either Williams' false representation, or Matthews' deliberate omission, or both. Absent this deceit, the '733 Patent would never have issued.

98. Thus, the '733 Patent was fraudulently obtained by Synopsys.

99. These fraudulent acts were then repeated when Synopsys filed the '501 Application. Yet again, Williams declared that he was an inventor, even though the subject matter of the application had been disclosed by Barbagallo *et al.* in 1996.

100. Then, once more, Synopsys violated its duty of candor and failed to cite the Barbagallo papers to the PTO during the prosecution of the '501 Application—indeed, it failed to cite any prior art whatsoever.

101. Once again, these false representations and deliberate omissions of facts material to patentability were made with the intent to deceive the PTO, and did in fact do so. Because the '501 Application issued as a patent, it may be inferred that the PTO relied on these false representations and deliberate omissions of material facts. But for the deliberate misrepresentations and omissions of Synopsys, the '501 Patent, like the '733 Patent before it, would not have been granted.

102. The '501 Patent was therefore also fraudulently obtained by Synopsys.

103. Not only has Magma been injured by the fraud committed by Synopsys, both the PTO and the public it serves have been injured as well. A patent by its very nature is imbued with a public interest. The far-reaching economic consequences of a patent give the public a paramount interest in seeing that patent monopolies derive from backgrounds free of fraud or other inequitable conduct. Where fraud is committed, injury to the public through a weakening of the patent system is manifest.

104. As a result of Synopsys's fraud on the PTO, the '733 and '501 Patents are unenforceable, against Magma or anyone else. But more than that, Synopsys is stripped of the antitrust immunity it would normally enjoy by asserting valid patents, and can therefore, as

detailed below, be held liable for violations of Section 2 of the Sherman Act, as well as other applicable laws.

**SYNOPSYS'S ATTEMPTED MONOPOLIZATION OF THE RELEVANT MARKET**

**THE RELEVANT MARKETS**

105. There are two relevant product markets at issue, both within the broader market of EDA software.

106. The first relevant market is that of logic synthesis (the "Logic Synthesis Market"). Software in this market performs the function of synthesis or translation of an RTL description into a gate-level description. According to December 2004 report by Gartner, Inc. (the "Gartner Report"), approximately \$225 million worth of products were sold in this market in 2003.

107. Products in the Logic Synthesis Market are reasonably interchangeable for the purposes for which they were produced, but are not interchangeable with products outside that market. Upon information and belief, to be competitive in the Logic Synthesis Market, a software product must perform scan-chain partitioning.

108. The second relevant market is that of scan-chain insertion (the "SCAN Market"). Software in this market is used to insert scan chains into the RTL description of an integrated circuit in order to provide testability to the circuit. According to the Gartner Report, approximately \$21 million worth of products were sold in this market in 2003.

109. Products in the SCAN Market are reasonably interchangeable for the purposes for which they were produced, but are not interchangeable with products outside that market. Upon information and belief, to be competitive in the SCAN Market, a software product must perform scan-chain partitioning.

110. The relevant geographic market for the purposes of Magma's counterclaim is worldwide.

### **SYNOPSYS'S MARKET POWER IN THE RELEVANT MARKETS**

111. According to the Gartner Report, as of October 2004 Synopsys had a 91% market share in the worldwide Logic Synthesis Market, Cadence Design Systems, Inc. had a 7% market share, while other unidentified companies held the remaining 2% market share.

112. According to the Gartner Report, as of October 2004 Synopsys had a 91% market share in the worldwide SCAN Market, Mentor Graphics Corp. had a 7% market share, and SynTest Technologies, Inc. held the remaining 2% market share.

113. Substantial barriers prevent the entry of new competitors or the expansion of smaller existing competitors in the relevant markets. These include large sunk costs, network effects, the "lock-in" effect, and high switching costs. Synopsys's anticompetitive practices have increased the already high barriers to entry facing competitors in the relevant markets. With those barriers in place, dominance once achieved cannot readily be reversed.

### **SYNOPSYS'S ANTICOMPETITIVE CONDUCT IN THE RELEVANT MARKETS AND ELSEWHERE**

114. Synopsys has engaged in anticompetitive conduct in the relevant markets and elsewhere. As described above, Synopsys fraudulently procured the '733 and '501 Patents and then, knowing that those patents were fraudulently obtained, asserted them against Magma.

115. Synopsys has also, since instigation of this lawsuit, made false and disparaging comments to Magma's customers and the general public. These comments include, but are not limited to, allegations that Magma's products infringe the fraudulently obtained patents, said statements being made while knowing that said patents were fraudulently obtained and therefore unenforceable against Magma.

116. Synopsys has also made false and disparaging comments to Magma's customers regarding the Northern District Action. In particular, Synopsys has told Magma's customers that Magma does not have the resources to successfully defend that action and continue a viable business. Upon information and belief, Synopsys has also attempted to create exclusive-dealing

arrangements with Magma's customers, in a further effort to destroy Magma's business and drive it into bankruptcy.

117. The effect of Synopsys's anticompetitive conduct has been to harm the competitive process and thereby consumers in the relevant markets. If Synopsys's anticompetitive behavior is not enjoined, consumers will be forced to pay higher prices than they would in freely competitive markets.

118. By reason of Synopsys's anticompetitive conduct, Magma has also been injured in its business and property in an amount that has yet to be determined but will be established at trial. Magma's injuries will at a minimum include the costs incurred in defense of Synopsys's bad faith action for patent infringement.

119. The harm and potential harm to Magma and customers in the relevant markets outweighs any potential harm to Synopsys from the entry of an appropriately tailored injunction. Entry of such an injunction restraining Synopsys's anticompetitive conduct will serve the public's interest in having free and open competition in the relevant markets.

#### **MAGMA'S UNIFIED DATA MODEL TECHNOLOGY**

120. One of Magma's key innovations was to design a single or a unified data model architecture to address the problems that arise when various software tools of the design flow, each of which have their own data models, are integrated only through a common database that resides on a computer disk.

121. The single data model forming the core of Magma's software was carefully architected to form the backbone for all the steps of the design flow—both the logic and physical phase, as well as all of the steps that implement these phases.

122. In Magma's design flow, a run-time single data model for the IC being designed resides in the main memory. As the design evolves towards the final layout, additional information is continuously incorporated into the same data model. Magma's innovation lies in designing a data model that is sufficiently compact so that it can permanently reside in the main

(or active) memory of the computer, but is still versatile enough to support all the diverse software tools needed to design a complex IC.

123. All of Magma's software products operate at extremely high speed because the necessary data resides in the main memory, and the time consuming step of accessing the database is minimized. Magma's single data model offers substantial productivity enhancement because it enables concurrent design—changes made to the design at any stage of the flow are available to all software tools, and consequently, several design problems can be solved concurrently.

124. The EDA industry has long desired a product offering that covers the entire design flow and also offers the benefits of a unified data model. Magma was the first company in the EDA industry to address that need. Historically, most of the EDA companies were founded to create products that addressed only a portion of the overall design flow, and they created data models only for narrow applications. Other EDA companies filled the gaps in their product portfolio through acquisitions. For example, Synopsys, founded in 1986, originally offered design tools for the logic synthesis phase only. To enter the physical synthesis market, Synopsys acquired Avant! in 2002. As a result, Synopsys's EDA products had been developed independently by different companies based on entirely different data models. Technologically, Synopsys fell behind Magma by failing to offer a product portfolio that drew upon the benefits of a single data model.

125. Magma was founded in 1997 with the vision to create a complete and integrated portfolio of next-generation IC design tools. Unencumbered by past acquisitions, Magma's engineers could design a cutting-edge product from scratch. Magma also employed scientists with expertise in different aspects of the IC design process. They laid the foundation for Magma's portfolio by first designing a single data model that could support the entire design flow.

## MAGMA'S PATENT

126. To protect the single data model developed by its engineers, Magma filed a patent application on April 27, 1999, directed to a common data model that can support the tools for logic and physical synthesis phases. On January 7, 2003, United States Patent No. 6,505,328 ("the '328 patent"), entitled "Method for Storing Multiple Levels of Design Data in a Common Database," was duly and legally issued to Magma. Magma is the owner of the entire right, title, and interest in and to the '328 patent. A true and correct copy of the '328 Patent is attached as Exhibit A.

## **SYNOPSYS'S INFRINGEMENT OF MAGMA'S '328 PATENT**

127. Synopsys has been marketing and selling software products that infringe the claims of Magma's '328 patent by employing a common data model to support several design tools concurrently. Astro, a tool for physical synthesis, is one such product that works in conjunction with Milkyway, a database to store design data on the computer disk. Synopsys began using Astro and Milkyway products after its Avant! acquisition. Astro tightly integrates the software tools needed for physical design, such as placement, routing, and timing, noise, and rail analyses engines. To achieve the integration, Astro relies on the Milkyway-DUO (Dynamic Unified Optimization) run-time representation. The DUO representation uses a compact run-time data structure on top of the Milkyway database. The Milkyway database is stored on the disk and the DUO data structure is maintained in the main memory of the computer. The run-time data structure ensures that all software tools associated with a specific optimization task can communicate while minimizing database accesses. In short, to achieve its effectiveness, Astro uses a single data model, just like the one developed by Magma, and disclosed and claimed in the '328 patent.

128. Since the EDA market began to acknowledge the innovative strength of Magma's products, Synopsys has been scrambling to gather competitive information through all possible means, including unfair and disreputable ones. Among other desperate measures, Synopsys has

directed its personnel to collect presentations from competitors, including Magma, by rummaging through the waste baskets in the customers' conference rooms.

129. Recent press releases indicate that Synopsys has intensified its efforts to copy Magma's patented single data model technology. Synopsys is expending substantial marketing efforts to launch a new product called "IC Compiler." Synopsys touts this product as the next generation physical design system and refers to it as the "centerpiece" of its Galaxy Design Platform 2005.

130. In its marketing literature, Synopsys states that the significant benefit of IC Compiler is its unified system that leverages a single data model. In other words, the key benefit of IC Compiler is that it leverages *Magma's* invention of a single data model concept for circuit design.

131. With the launch of IC Compiler, Synopsys's infringement of the '328 patent has extended to new products. IC Compiler offers several software tools geared towards the physical synthesis or the back-end of the design flow, and incorporates functionality from two other products from Synopsys: the Astro product and the Physical Compiler product. Synopsys's Physical Compiler product offers tools for the back-end portion of the design flow. Synopsys has stated that the IC Compiler is a result of a major re-architecting of these two Synopsys's products—i.e., Astro and Physical Compiler. Synopsys claims that 30 to 40 percent of the code in IC Compiler is new. In light of Synopsys's assertions, it is highly likely that the new code substantially relates to Synopsys's incorporation of Magma's single data model invention, as disclosed and claimed in the '328 patent, into its IC Compiler product.

132. Synopsys also advertises that it has extended its Milkyway database to handle synthesis attributes and constraints. The inevitable next step is increased infringement of Magma's '328 patent. Synopsys intends to extend its single data model (based on Magma's patented technology) to support both logic and physical synthesis products.

133. Synopsys's efforts to copy Magma's innovative technology are continuing, and Magma requires the intervention of this Court to stop Synopsys's continuing infringement of its patent and other acts of unfair competition.

### **CLAIMS FOR RELIEF**

#### **COUNT 1 – MONOPOLIZATION**

134. Magma repeats and realleges each and every allegation contained in paragraphs 1 through 133 above with the same force and effect as if here set forth in full.

135. Synopsys possesses monopoly power in both the Logic Synthesis Market and the SCAN Market.

136. Through the anticompetitive conduct described above, Synopsys has willfully maintained, and, unless restrained by this Court, will continue to willfully maintain and extend, its monopoly power by anticompetitive and unreasonably exclusionary conduct.

137. Synopsys has acted with intent to illegally maintain its monopoly power in the Logic Synthesis Market and the SCAN Market, and its illegal conduct has enabled it to do so, in violation of Section 2 of the Sherman Act, 15 U.S.C. § 2.

138. Synopsys's conduct described in this Complaint has had a substantial effect on interstate commerce and it will continue to have such an effect.

#### **COUNT 2 – ATTEMPTED MONOPOLIZATION**

139. Magma repeats and realleges each and every allegation contained in paragraphs 1 through 133 above with the same force and effect as if here set forth in full.

140. Synopsys has attempted to monopolize both the Logic Synthesis Market and the SCAN Market through the acts and practices described above.

141. Synopsys has specific intent to achieve monopoly power in these markets, and in furtherance of this intent has engaged in the exclusionary conduct described above.

142. Synopsys has demonstrated its intent to monopolize these markets by, *inter alia*, its fraudulent procurement of the '733 and '501 Patents and its bad faith assertion of those patents against Magma in this litigation, knowing that they were fraudulently obtained.

143. There is a dangerous probability that Synopsys can and will achieve a monopoly in the Logic Synthesis Market and the SCAN Market, in violation of Section 2 of the Sherman Act, 15 U.S.C. § 2.

144. Synopsys's conduct described in this Complaint has had a substantial effect on interstate commerce and it will continue to have such an effect.

### **COUNT 3 – PRODUCT DISPARAGEMENT AND TRADE LIBEL**

145. Magma repeats and realleges each and every allegation contained in paragraphs 1 through 133 above with the same force and effect as if here set forth in full.

146. Synopsys's actions described above constitute false and/or misleading representations of fact made in connection with goods and services in commercial advertising or promotion. Specifically, Synopsys has represented to Magma's customers and the public that Magma's products infringe the patents-in-suit, when it knows that those patents were obtained by fraud on the PTO.

147. By its false and misleading statements of fact and/or material omissions, Synopsys has violated Section 43(a) of the Lanham Act, 15 U.S.C. § 1125(a).

148. Magma has been damaged, and is likely to be damaged, by Synopsys's actions in violation of Section 43(a) of the Lanham Act. Magma therefore seeks injunctive relief pursuant to 15 U.S.C. § 1116(a), plus monetary relief comprising Synopsys's profits, all damages sustained by Magma, treble damages, and reasonable attorneys' fees and costs pursuant to 15 U.S.C. § 1117(a).

### **COUNT 4 – STATUTORY UNFAIR COMPETITION**

149. Magma repeats and realleges each and every allegation contained in paragraphs 1 through 133 above with the same force and effect as if here set forth in full.

150. Synopsys's actions described above constitute unfair competition and deceptive trade practices in violation of the Delaware Uniform Deceptive Trade Practices Act, Del. Code Ann. tit. 6 §§ 2531 *et seq.*

151. Magma seeks injunctive relief pursuant to Del. Code Ann. tit. 6 § 2533. Due to Synopsys's willful engagement in deceptive trade practices in violation of the statute, Magma also seeks costs and attorneys' fees pursuant to same.

#### **COUNT 5 – COMMON LAW UNFAIR COMPETITION**

152. Magma repeats and realleges each and every allegation contained in paragraphs 1 through 133 above with the same force and effect as if here set forth in full.

153. Synopsys's actions described above constitute unfair competition and product disparagement in violation of Delaware common law.

154. Magma has been injured by the acts complained of above, and seeks damages in compensation thereof, as well as injunctive relief and reasonable costs and attorneys' fees.

#### **COUNT 6 – TORTIOUS INTERFERENCE WITH BUSINESS RELATIONS**

155. Magma repeats and realleges each and every allegation contained in paragraphs 1 through 133 above with the same force and effect as if here set forth in full.

156. As a provider of EDA software and related services, Magma has business relationships with various customers in the United States and around the world. Through the acts complained of above, Synopsys has specifically interfered with those business relationships, with either the sole purpose of harming Magma, or by using dishonest, unfair, or improper means. As a result of Synopsys's interference, Magma's relationships with its customers have been injured and Magma has suffered damages in an amount to be fully determined at trial.

#### **COUNT 7 – INFRINGEMENT OF MAGMA'S '328 PATENT**

157. Magma repeats and realleges each and every allegation contained in paragraphs 1 through 133 above with the same force and effect as if here set forth in full.

158. On information and belief, Synopsys has infringed and continues to infringe; has induced and continues to induce others to infringe; and/or has committed and continues to commit acts of contributory infringement of, one or more of the claims of the '328 patent. Synopsys's infringing activities in the United States and this District include the development, manufacture, use, importation, sale, and/or offer for sale of products, including but not limited to IC Complier and Astro, and contributing to and inducing others to do the same. Such products have no substantial non-infringing use. Synopsys's infringing activities violate 35 U.S.C. § 271.

159. On information and belief, Synopsys's infringement has been, and continues to be, willful and deliberate, and has caused substantial damage to Magma.

160. On information and belief, Synopsys's infringement in violation of the federal patent laws will continue to injure Magma unless otherwise enjoined by this Court.

#### PRAYER FOR RELIEF

WHEREFORE, Defendant and Counterclaimant Magma prays as follows:

- (a) that the Court dismiss the Complaint with prejudice and that Synopsys takes nothing by virtue of the Complaint;
- (b) that the Court render judgment declaring that Magma has not infringed and is not infringing the '733 Patent;
- (c) that the Court render judgment declaring that the '733 Patent is invalid;
- (d) that the Court render judgment that the '733 Patent is unenforceable due to inequitable conduct;
- (e) that the Court render judgment declaring that Magma has not infringed and is not infringing the '501 Patent;
- (f) that the Court render judgment declaring that the '501 Patent is invalid;
- (g) that the Court render judgment that the '501 Patent is unenforceable due to inequitable conduct;
- (h) that the Court render judgment declaring that Magma has not infringed and is not

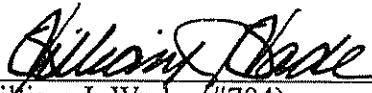
infringing the '508 Patent;

- (i) that the Court render judgment declaring that the '508 Patent is invalid;
- (j) that the Court permanently enjoin and restrain Synopsys, its successors, assigns, subsidiaries and transferees, and its officers, directors, agents, employees, from engaging in the unlawful practices described in this Complaint and from engaging in any similar unlawful practices;
- (k) that the Court render judgment declaring that Synopsys has infringed, induced the infringement of, and contributorily infringed the '328 patent in violation of 35 U.S.C. § 271;
- (l) that the Court render judgment declaring Synopsys's infringement of the '328 patent willful and deliberate;
- (m) that Magma be awarded damages adequate to compensate Magma for Synopsys's infringement of the '328 patent;
- (n) that the Court preliminarily and permanently enjoin Synopsys, its successors, assigns, subsidiaries and transferees, and its officers, directors, agents, employees, as follows:
  1. from selling or offering to sell any product falling within the scope of the claims of the '328 patent, including IC Compiler and Astro;
  2. from importing any product into the United States which falls within the scope of the claims of the '328 patent;
  3. from manufacturing any product falling within the scope of the claims of the '328 patent;
  4. from using any product or method falling within the scope of any of the claims of the '328 patent;
  5. from actively inducing others to infringe any of the claims of the '328 patent;
  6. from engaging in acts constituting contributory infringement of any of the claims of the '328 patent;
  7. from all other acts of infringement of any of the claims of the '328 patent;
- (o) that the Court award treble damages to Magma for the unlawful practices

described in this Complaint;

- (p) that the Court enter judgment against Synopsys for the maximum penalties determined by the Court to be just and proper;
- (q) that the Court render judgment declaring this to be an exceptional case;
- (r) that Magma be awarded its costs of suit, including reasonable attorneys' fees; and
- (s) that Magma be awarded such other and further relief as the Court deems just and proper.

Dated: October 25, 2005

  
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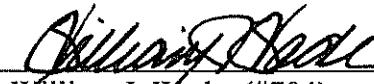
UNITED STATES DISTRICT COURT  
DISTRICT OF DELAWARE

**CERTIFICATE OF SERVICE**

I HEREBY CERTIFY that on October 25, 2005, I electronically filed the foregoing document with the Clerk of Court using CM/ECF which will send notification of such filing, and which has also been served as noted:

**BY HAND**

Karen Jacobs Louden, Esquire  
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\_\_\_\_\_  
William J. Wade (#704)

DATED: October 25, 2005